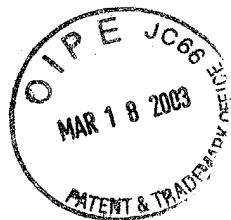


3. (Unchanged) The integrated circuit of claim 2, wherein the circuit material connects circuit material within top channels and circuit material within bottom channels through molded voids in said injection-molded substrate.
4. (Unchanged) The integrated circuit of Claim 2, wherein said voids have a substantially conical shape to promote plating growth through said voids.
5. (Unchanged) The integrated circuit of Claim 1, further comprising at least one other die mounted on the substrate, and wherein the circuit material further forms electrical connections between the die and the at least one other die.
6. (Unchanged) The integrated circuit of Claim 1, wherein the substrate and the circuit material form die connection pads for solder-ball mounting of the die to the substrate.
7. (Unchanged) The integrated circuit of Claim 6, wherein the circuit material further forms wire bond pads for attaching wire-bond connections from the die.
8. (Unchanged) The integrated circuit of Claim 1, further comprising a solderable plating layer deposited over the circuit material for preventing oxidation of the circuit material.
9. (Unchanged) The integrated circuit of Claim 1, wherein the circuit material forms wire bond pads for attaching wire-bond connections from the die.

10. (Unchanged) The integrated circuit of Claim 9, wherein the substrate includes a well for mounting the die and wire-bond pads on a top side of the substrate, and wherein the wire-bond connections extend from the top of the die to the wire bond pads.

11. (Unchanged) The integrated circuit of Claim 1, further comprising a conductive sheet on the bottom of the substrate, and where the circuit material connects circuit material within top channels with the conductive sheet.

12. (Unchanged) An integrated circuit, comprising:



an injection-molded substrate;

a die mounted to the substrate;

a plurality of electrical terminals mounted to the substrate for connecting the die to external circuits; and

means for electrically connecting the die to the plurality of electrical terminals.

Claims 13-20 were previously Canceled.

21. (Unchanged) An integrated circuit, comprising:

a substrate having top channels for addition of a circuit material, the top channels having sides extending to a plane defining a top surface of the substrate and a bottom beneath the plane;

a die mounted to the substrate;

means mounted to the substrate for connecting the die to external circuits; and

means deposited within the channels for forming an electrical connection between the die and the means mounted to the substrate.

22. (Amended) The integrated circuit of Claim 1, wherein the substrate further has bottom channels having sides extending to a bottom plane defining a bottom surface of the substrate and a top beneath the top surface, and wherein the circuit material is further deposited within the bottom channels.

23. (Unchanged) The integrated circuit of Claim 22, wherein the substrate is an injection molded substrate.
24. (Unchanged) The integrated circuit of Claim 23, wherein the circuit material connects circuit material within top channels and circuit material within bottom channels through molded voids in the injection molded substrate.
25. (Unchanged) The integrated circuit of Claim 23, further comprising at least one other die mounted on the substrate, and wherein the circuit material further forms electrical connections between the die and the at least one other die.
26. (Unchanged) The integrated circuit of Claim 23, wherein the substrate and the circuit material form die connection pads for solder-ball mounting of the die to the substrate.
27. (Unchanged) The integrated circuit of Claim 23, wherein the circuit material forms wire bond pads for attaching wire-bond connections from the pad.

## **REMARKS**

### **1. Objections to the Claims**

In the Office Action, the Examiner has objected to Claims 2 and 22 under 35 U.S.C. §112 as containing subject matter not disclosed in the specification. Claims 2 and 22 have been amended to reflect the disclosed features of the present invention.

## 2. Rejections under 35 U.S.C. §102

In the Office Action, the Examiner has rejected Claims 21 and 22 under 35 U.S.C. 102(b) as being anticipated by Beaman, et al. (U.S. 5,371,654). Applicants respectfully traverse the above rejections.

Claim 21 (as well as dependent Claim 22) recites "a substrate having top channels for addition of circuit material, the top channels having sides extending to a plane defining a top surface of the substrate and a bottom beneath the plane."

Applicants respectfully submit that Figure 1 of Beaman was not intended to describe a substrate having channels, and that, in fact, the invention of Beaman does not include such channels. Beaman does not teach the formation of channels for introduction of circuit material anywhere in the specification, and in fact recites that the interconnect layer 12 is a thin film wiring layer containing typical X, Y and reference planes (Beaman, Col. 4 lines 55-59). Applicants therefore believe that the drawing of Figure 1 is a simplified drawing that does not properly show the detail of multilayer circuit 12. In Beaman col. 3, lines 28-30, the inventors of that structure recite that "multilevel wiring structure 12 contains at least one layer of electrical conductors 14 such as copper aluminum or gold and has *on surface 16* a plurality of contact locations 18.

Referring to Figure 2 of Beaman, Applicants note that at cut-away locations in multilayer circuit 12, conductors 18 are clearly shown as overhanging the edges of the dielectric, illustrating that the conductor is in fact, located above the surface. Further reference to details of the interconnect means shown in Figure 6, reveals a multilayer interconnect having a proper view of conductor 92 above dielectric 105. Therefore, it is believed that Beaman does not in actuality teach the channels of the present invention.

Throughout Beaman generally, multilayer circuit 12 is described as a thin film layer fabricated by known thermal compression bonding techniques, which is to say, separate metal and dielectric layers bonded together. Therefore, the channels of the present invention are absent from Beaman.

## 2. Rejections under 35 U.S.C. §103(a)

In the Office Action, the Examiner has rejected Claims 1-3, 5-7, 9, 12 and 23-27 35 U.S.C. 103(a) as being unpatentable over Beaman, in view of Schmidt (U.S. 4,996,391). Applicants respectfully traverse the above rejections.

For the reasons stated above, Applicants believe that Beaman does not teach the channels of the present invention as recited in Claims 1 and 21 and form the connecting means recited in Claim 12.

Further, while Schmidt teaches injection molding of circuits, Schmidt is directed toward replacement of printed circuit boards with injection-molded structures, as evidenced by the description of addition of solder-stop lacquer, tinning and other processes consistent with a large-scale printed circuit board replacement for interconnecting discrete components and directed toward substrates for use within integrated circuits to connect dies and other integrated components to external terminals. Therefore, Applicants believe that the combination of Beaman and Schmidt does not teach or suggest the channels of the present invention.

Applicants respectfully submit that Applicants' claimed invention is deserving of patent protection because it describes a useful and functioning structure, which is patentably distinguishable over the prior art.

In conclusion, Applicants respectfully submit that this Amendment, in view of the Remarks offered in conjunction therewith, are fully responsive to all aspects of the objections and rejections tendered by the Examiner in the Office Action. Applicants respectfully submit that they have persuasively demonstrated that the above-identified Patent Application, including Claims 1-12 and 21-27 are in condition for allowance. Such action is earnestly solicited.

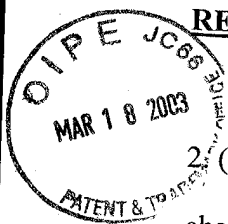
It is not believed that this Amendment letter requires any fee, but if there are any fees incurred by this Amendment Letter, please deduct them from our Deposit Account NO. 23-0830.

Respectfully submitted,

A handwritten signature in cursive script, reading "Andrew M. Harris", followed by a stylized flourish or set of initials.

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**REDACTED COPY OF AMENDED CLAIMS**

2. (Amended) The integrated circuit of Claim 1, wherein the substrate further has bottom channels having sides extending to a bottom plane defining a bottom surface of the substrate and a top beneath the top surface [bottom plane], and wherein the circuit material is further deposited within the bottom channels.

22. (Amended) The integrated circuit of Claim 1, wherein the substrate further has bottom channels having sides extending to a bottom plane defining a bottom surface of the substrate and a top beneath the top surface [bottom plane], and wherein the circuit material is further deposited within the bottom channels.